

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

The pending claims are repeated herein without amendment.

1. (PREVIOUSLY PRESENTED) An optical pulse addition device for use in a demultiplexing/multiplexing of a plurality of time-division multiplexed optical signals in terms of time without converting the optical signals into a plurality of electrical signals, comprising:

a chirp unit generating a frequency chirp in an inputted optical signal composed of a plurality of optical pulses and extending a spectrum of the optical pulse;

a transmission unit transmitting a part of the extended spectrum through a band around a prescribed wavelength; and

an addition unit adding an optical pulse corresponding to the transmitted band to a time-division multiplexed optical signal with the prescribed wavelength.

2. (ORIGINAL) The optical pulse addition device according to claim 1, wherein said chirp unit is made of a third order non-linear medium.

3. (ORIGINAL) The optical pulse addition device according to claim 2, wherein said third order non-linear medium is made of a semiconductor.

4. (ORIGINAL) The optical pulse addition device according to claim 2, wherein said third order non-linear medium is made of an optical fiber.

5. (PREVIOUSLY PRESENTED) The optical pulse addition device according to claim 4, wherein the optical fiber is a single-mode fiber, in which a non-linear refractive index of a core is set to a larger value than that of a normal single-mode fiber and the mode field diameter of which is reduced by performing control of both a specific refractive index difference between the core and a cladding and a core diameter.

6. (ORIGINAL) The optical pulse addition device according to claim 5, wherein the non-linear refractive index of the core in the fiber is obtained by doping  $\text{GeO}_2$  to the core and doping fluorine to the cladding.

7. (ORIGINAL) The optical pulse addition device according to claim 4, wherein the optical fiber is a dispersion -flat fiber.

8. (ORIGINAL) The optical pulse addition device according to claim 4, wherein the optical fiber is a holey fiber.

9. (ORIGINAL) The optical pulse addition device according to claim 4, further comprising:

an amplification unit amplifying a strength level of an optical pulse inputted to the optical fiber up to a level such that a prescribed chirp can be generated in the optical fiber.

10. (ORIGINAL) The optical pulse addition device according to claim 1, further comprising

an optical branching unit branching a part of a time-division multiplexed signal composed of optical pulses, wherein

the part of the branched time-division multiplex signal is inputted to said chirp unit.

11. (PREVIOUSLY PRESENTED) The optical pulse addition device according to claim 10, wherein a light intensity modulator, an interferometer type non-linear optical switch or a four-optical wave mixer is used for said optical branching unit.

12. (ORIGINAL) The optical pulse addition device according to claim 1, wherein said transmission unit has a plurality of transmission bands.

13. (PREVIOUSLY PRESENTED) An optical time-division multiplexed apparatus for use in a demultiplexing/multiplexing of a plurality of time-division multiplexed optical signals in terms of time without converting the optical signals into a plurality of electrical signals, comprising:

a chirp unit generating a frequency chirp in an inputted optical signal composed of a plurality of optical pulses and extending a spectrum of the optical pulse;

a transmission unit transmitting a part of the extended spectrum through a band around a

prescribed wavelength; and

an addition unit adding the optical pulse corresponding to the transmitted band to a time-division multiplexed optical signal with the prescribed wavelength.

14. (PREVIOUSLY PRESENTED) The optical time-division multiplexed apparatus according to claim 13, which increases a multiplex degree of time-division multiplex signals by repeating processes of said chirp unit, transmission unit and addition unit.